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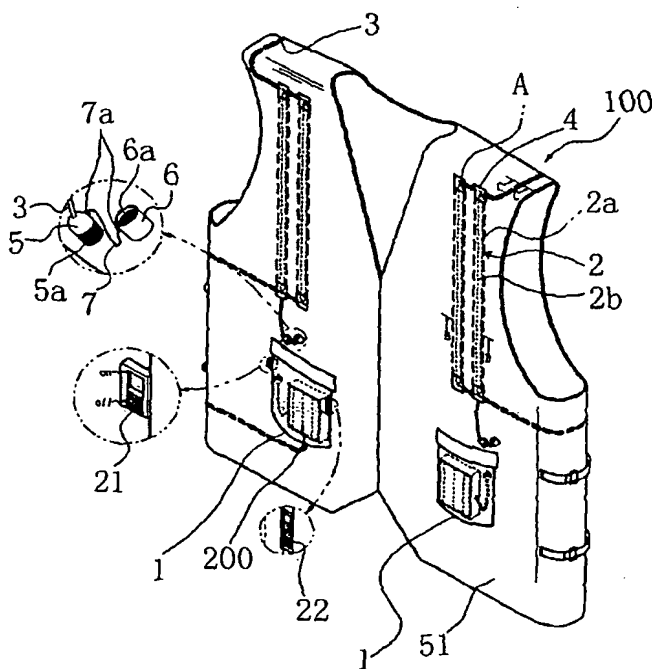
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(54) Title: **WASHABLE ELECTRIC HEATING GARMENT AND ELECTRIC HEATING DEVICE THEREOF**



(57) Abstract: Disclosed is a washable electric heating article for use in winter. Electric heating wires are arranged between inner and outer layers of the article, and connected in parallel by an electric wire. Connected portions of the electric heating wires are sealed by insulators. The electric heating wires and electric wire are subjected to a sewing treatment. The article has pockets for receiving batteries, and a control panel. The batteries are connected to the electric heating wires by connecting jacks. Each connecting jack is provided with a sealing cover so that it is prevented from contacting water during a procedure of washing the article. Thus, the article is washable without removal of the electric heating wires. Each electric heating wire can have insulating and far infrared ray radiating effects by providing an appropriate sheath while wrapping or laminating an additional inner layer, a double-sided tape, and a sponge thereon.

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## WASHABLE ELECTRIC HEATING GARMENT AND ELECTRIC HEATING DEVICE THEREOF

### Technical Field

5 The present invention relates to an electric heating garment for use in winter, and more particularly to a washable electric heating product, such as a garment, for example, a jacket or trousers, a shoe, an abdominal binder, or a glove, carrying embedded electric heating wires so as to be used in winter, and an electric heating device thereof.

10 More particularly, the present invention provides a product including heating wires coated with a mixture of materials capable of suppressing harmful electromagnetic waves, and generating far infrared rays known to be beneficial to the human body, so as to be helpful to health, while being processed to obtain an excellent waterproof property allowing the product to be washable, and achieving an improvement in insulating or warming property.

15 The present invention also provides an electric heating device embedded in a washable product (for example, a coat, trousers, a shoe, an abdominal binder, a jacket, a dress, or a glove) while allowing the product to be washable without prior removal of its electric heating wires.

### Background Art

20 Generally, electric heating products such as electric floor mats or electric mats include an embedded heating element. This heating element generates heat using AC power. In most electric heating products, such a heating element typically comprises a single electric heating wire. This electric heating wire is connected to an AC power source, and its heating temperature is controlled by a  
25 temperature controller.

However, such electric heating products have a drawback in that they cannot be applied to a portable article such as a jacket worn by the user because they must use an AC power source. Such a jacket is frequently used when the wearer goes fishing or goes on a journey because the wearing thereof is convenient.  
30 Conventionally, such a jacket is mainly used as a garment for use in winter.

Such a conventional jacket has a structure including down interposed between outer and inner layers, fur provided on the inner layer, or pockets formed at the inner layer to receive warming packs, in order to provide an insulating function of retaining warmth to some degree.

35 In order to greatly increase the insulating function, a jacket has also been

proposed which carries an embedded electric heating wire. This electric heating wire can provide a beneficial insulating effect to the wearer in winter, but also to the wearer mainly working in sub-zero temperature conditions (for example, in a cold storage warehouse) according to his occupation demands.

5           However, such electric heating wire used in the conventional jacket uses a DC power. For this reason, there is a problem in that the usable time of the jacket is too short due to a high power consumption rate. In particular, emission of harmful waves from the electric heating wire causes the body energy of the user to weaken. For this reason, the conventional jacket has a drawback in that it cannot  
10 protect the body of the user from diverse harmful electromagnetic waves even though it has an insulating function.

          The conventional jacket having the embedded electric heating wire has another drawback in that it cannot be washed when its surface is dirtied or stained by foreign matters. Although the conventional winter jacket having the embedded  
15 electric heating wire as mentioned above should be configured to completely seal the electric heating wire, such a sealing effect is incompletely obtained. For this reason, if the jacket is washed, a short circuit then occurs at the electric heating wire. To this end, when the jacket, which has been dirtied, is to be washed, the electric heating wire embedded in the jacket should be completely removed. This  
20 removal procedure is inconvenient.

          In order to solve this problem, there has been proposed an electric heating jacket in which electric heating wires are detachably attached to the jacket. However, this structure has a drawback in that it is impossible to achieve an effective transfer of heat generated from the electric heating wires.

## 25   Disclosure of the Invention

          Therefore, an object of the invention is to provide an electric heating garment for use in winter comprising: electric heating wires each including a heating core wire adapted to generate heat upon receiving electric power, and a sheath coated over the heating core wire; the electric heating wires being arranged  
30 in parallel between inner and outer layers of the garment, each of the electric heating wires having a predetermined length; an electric wire connecting the electric heating wires in parallel; silicon insulators adapted to seal connected portions of the electric heating wires to the electric wire; movement preventing lines formed at the inner and outer layers along the electric heating wires and electric wire at opposite  
35 sides of the electric heating wires and electric wire, and adapted to prevent the electric heating wires and electric wire from moving, respectively; and pockets

adapted to separably receive rechargeable batteries adapted to supply electric power to the electric heating wires, and a control panel.

The electric heating wires may be formed by cutting a straight electric heating wire product into pieces each having a predetermined length.

5       The control panel may comprise an operating switch adapted to switch on/off the supply of electric power to the electric heating wires, a remaining power display unit for displaying a charged/discharged state of the batteries, and a temperature controller adapted to allow a wearer wearing the garment to optionally adjust a heating temperature of the electric heating wires.

10       The electric heating garment may further comprise first connecting jacks provided at the batteries, respectively, first connecting plugs respectively connected to opposite ends of the electric wire while being externally exposed, the first connecting plugs being connected to the first connecting jacks to supply electric power from the batteries to the electric heating wires, respectively, and sealing  
15       covers connected to the first connecting plugs by strings, and adapted to be coupled to the first connecting plugs to prevent the first connecting plugs from contacting water, respectively, whereby the garment is washable after removal of the batteries and control panel from the pockets.

20       The sheath may be made of a material produced by mixing a mixture of elvan, yellow earth, and gem powder with Teflon exhibiting superior waterproof and conductive properties.

Each of the electric heating wires is wrapped by an additional inner layer coated with a heat loss preventing agent, and subjected to a bonding treatment using an adhesive or a sewing treatment using threads.

25       Each of the electric heating wires may be wrapped by a double-sided tape coated, at both surfaces thereof, with yellow earth powder, elvan powder, gem powder or charcoal powder. An additional inner layer coated with a heat loss preventing agent for preventing heat from escaping may be laminated over the double-sided tape. The electric heating wire, double-sided tape, and additional  
30       inner layer may be subjected to a bonding treatment using an adhesive or a sewing treatment using threads.

In place of the parallel arrangement, the electric heating wires wrapped by the double-sided tape may have a diagonally crossing arrangement.

35       A high-formable sponge may be interposed between the additional inner layer and the outer layer.

The garment may have the form of a jacket. In this case, the jacket may have heating sections defined by the electric heating wires at both front portions

thereof and a back portion thereof, respectively.

The jacket may have a plurality of straight elastic bands arranged at shoulder and flank portions of the jacket. Each elastic band may have an elasticity to bring the jacket to come into tight contact with the body of a wearer wearing the jacket.

Alternatively, the garment may have the form of trousers. In this case, each of the trousers may have heating sections defined by the electric heating wires at a front surface thereof, a waist portion thereof, and a back surface thereof, respectively.

A first additional inner layer coated with a heat loss preventing agent may be wrapped around each electric heating wire to provide a width for receiving an expansion of the electric heating wire occurring when the electric heating wire generates heat. A double-sided tape coated, at both ends thereof, with a material beneficial to health may be wrapped over the first additional inner layer. A second additional inner layer coated with a heat loss preventing agent may be wrapped over the double-sided tape to prevent the heat generated from the electric heating wire from escaping through the outer layer. A high-foamable sponge may be interposed between the second additional inner layer and the outer layer to enhance an ability of the article to come into contact with the body of the wearer.

The control panel may further include radio-frequency receiving means. In this case, the control panel may be controlled by an external radio-frequency transmitting remote controller.

The electric heating structure of the present invention may be applied to articles other than garments. For example, the electric heating structure may be applied to a shoe. In this case, the electric heating wires may be arranged on an upper surface of an outer sole of the shoe. The batteries and operating switch may be arranged in a heel portion of the shoe or an optional portion of the shoe, and connected to the electric heating wires by the connecting jack which is insulatable and sealable.

The electric heating structure may also be applied to an abdominal binder, a cushion, and other electric heating articles.

#### Brief Description of the Drawings

The above objects, and other features and advantages of the present invention will become more apparent after a reading of the following detailed description when taken in conjunction with the drawings, in which:

Fig. 1 is a perspective view illustrating the structure of a washable electric

heating jacket for use in winter in accordance with an embodiment of the present invention;

Fig. 2 is a rear view illustrating the structure of the washable electric heating jacket according to the embodiment of the present invention;

Fig. 3 is a view illustrating the connection between a first connecting jack and a first connecting plug in accordance with the embodiment of the present invention;

Fig. 4 is a sectional view illustrating a state in which the first connecting plug is sealed by a cover in accordance with the embodiment of the present invention;

Fig. 5 is a view illustrating the structure of an electric heating wire according to the embodiment of the present invention;

Fig. 6 is a cross-sectional view taken along the line B – B' of Fig. 1;

Fig. 7 is a cross-sectional view taken along the line C – C' of Fig. 1;

Figs. 8 and 9 are perspective and sectional views respectively illustrating a fitting structure for the first connecting plug and sealing cover;

Fig. 10 is a perspective view illustrating the structure of a washable electric heating jacket for use in winter in accordance with another embodiment of the present invention;

Fig. 11 is a sectional view illustrating inner and outer layers of an article for use in winter in accordance with the present invention;

Fig. 12 is a sectional view illustrating the materials of a washable electric heating jacket for use in winter in accordance with an embodiment of the present invention;

Fig. 13 is a sectional view illustrating the materials of a washable electric heating jacket for use in winter in accordance with another embodiment of the present invention;

Fig. 14 is a perspective view illustrating a structure in which electric heating wires are arranged in a washable article (trousers) in accordance with another embodiment of the present invention;

Fig. 15 is a perspective view illustrating the structure of a panel for controlling the heating operation of electric heating wires applied to a washable article (trousers) in accordance with another embodiment of the present invention;

Fig. 16 is a perspective view illustrating a structure in which electric heating wires are arranged in a washable article (the outer sole of a shoe) in accordance with another embodiment of the present invention;

Fig. 17 is a cross-sectional view taken along the line C - C of Fig. 16;

Fig. 18 is an exploded perspective view illustrating a structure in which electric heating wires are arranged in a washable article (the inner sole of a shoe) in accordance with another embodiment of the present invention;

Fig. 19 is a view illustrating a structure in which electric heating wires are arranged in a washable article (abdominal binder) in accordance with another embodiment of the present invention; and

Fig. 20 is a cross-sectional view taken along the line E - E of Fig. 19.

### Best Mode for Carrying Out the Invention

#### Embodiment 1

Now, a preferred embodiment of the present invention will be described in conjunction with the annexed drawings.

Referring to Figs. 1 to 7, a jacket 100 having a plurality of pockets 1 is illustrated. As shown in Figs. 1 to 7, the jacket 100 includes electric heating wires 2 each having a core wire 2a and a sheath 2b. The electric heating wires 2 are embedded in the jacket 100, and connected in parallel by electric wires 3. The electric heating wires 2 and electric wires 3 are firmly held on the jacket 100 by sewing lines 8 formed along the electric heating wires 2 and electric wires 3 at opposite sides of the electric heating wires 2 and electric wires 3, so that they are prevented from moving during a procedure of washing the jacket 100.

In order to prevent water from penetrating into each core wire 2a through an externally exposed portion thereof during the procedure of washing the jacket 100, insulators 4 made of a silicon material are coated on the core wire 2a at regions A where the core wire 2a is connected to the electric wire 3.

The jacket 100 is provided with pockets 1 for receiving rechargeable batteries 200. A first connecting jack 10 is connected to each battery 200 such that it is integral with the battery 200. A first connecting plug 5 is connected to one of electric heating wires 2 embedded in the front portion of the jacket 100 such that it is externally exposed. The first connecting plug 5 is connected to the first connecting jack 10 of the battery 200 received in an associated one of the pockets 1 so as to supply electric power from the battery 200 to the associated electric heating wire 2.

A sealing cover 6 is threadedly coupled to each first connecting plug 5 to prevent water from penetrating into the first connecting plug 5 during the procedure of washing the jacket 100. The sealing cover 6 is connected to the first connecting plug 5 by a string 7.



Connected to the batteries 200 are an operating switch 21 adapted to conduct ON/OFF switching operations for controlling the supply of electric power to the electric heating wires 2, and a remaining power display unit (indicator) 22 for allowing the wearer to check the charged/discharged state of the batteries 200. The operating switch 21 and remaining power display unit 22 are externally exposed.

In accordance with one aspect of the present invention, the sheath 2b is made of a material produced by mixing a mixture of elvan, yellow earth, and gem powder with Teflon exhibiting superior waterproof and conductive properties, so as to radiate far infrared rays considerably beneficial to health while absorbing harmful waves generated due to the heating operation of the core wire 2a.

In accordance with another aspect of the present invention, the first connecting plug 5 is provided with a first threaded portion 5a at its outer circumferential surface, whereas the sealing cover 6 is provided with a second threaded portion 6a at its inner circumferential surface. By this configuration, the first connecting plug 5 and sealing cover 6 can be threadedly coupled to each other. A sealing O-ring 5b is fitted around the outer circumferential surface of the first connecting plug 5 so as to completely seal the first connecting plug 5 in a state of being coupled with the sealing cover 6.

Alternatively, the first connecting plug 5 and sealing cover 6 may be coupled to each other in a fitting fashion, as shown in Figs. 8 and 9. In this case, a plurality of sealing O-rings 5b may be fitted around the outer circumferential surface of the first connecting plug 5, in order to completely seal the first connecting plug 5. Of course, the present invention is not limited to this configuration.

The first connecting jack 10, operating switch 21, and remaining power display unit 22, which are connected to the batteries 200, are configured to be removable from the jacket 100 along with the batteries 200 when the jacket 100 is to be washed.

Preferably, at least four electric heating wires 2 are laterally arranged at the front portion of the jacket 100, whereas at least five electric heating wires 2 are laterally arranged at the back portion of the jacket 100. Preferably, the electric heating wires 2 are designed to have a combined resistance of 2  $\Omega$  or less, and a unit length of about 50 cm.

Preferably, the batteries 200 supply a voltage of 3.6 V across each electric heating wire 2. This voltage may be supplied by connecting, in parallel, two sets of three rechargeable 1.2 V batteries connected in series, or connecting, in parallel,

two sets of five rechargeable 1.2 batteries connected in series. Of course, the present invention is not limited to such connection arrangements.

The reference numeral 7a denotes rings for fixing opposite ends of the string 7 adapted to connect the first connecting plug 5 and cover 6, respectively.

5 Now, the manufacturing procedure and operation of the above described configuration according to the illustrated embodiment of the present invention will be described in conjunction with Figs. 1 to 7.

10 First, an electric heating wire product is manufactured by coating, around a core wire 2a, a sheath 2b made of a material produced by mixing a mixture of elvan, yellow earth, and gem powder with Teflon exhibiting superior waterproof and conductive properties, so as to radiate far infrared rays considerably beneficial to health while absorbing harmful waves generated due to the heating operation of the core wire 2a.

15 The electric heating wire product is then cut into pieces having a length of about 50 cm, that is, electric heating wires 2. The sheath 2b of each electric heating wire 2 is peeled off at opposite end portions of the electric heating wire 2, so that the core wire 2a is externally exposed at those end portions.

20 Thereafter, the electric heating wires 2 are embedded in the front and rear portions of the jacket 100 such that they are laterally arranged at those portions. An electric wire 3 is connected to the exposed portions of the core wires 2a of the electric heating wires 2, so that the electric heating wires 2 are connected in parallel. The electric wires 3 are also embedded in the jacket 100.

25 The core wires 2a are coated by the insulator 4 made of a silicon material at regions A where the core wires 2a are connected to the electric wire 3, so that they are completely sealed. Thus, the waterproofing treatment for the connecting portions of the core wires 2a and electric wire 3 is completed. Sewing lines 8 are then formed along the electric heating wires 2, electric wires 3, and insulators 4 at opposite sides of the electric heating wires 2, electric wires 3, and insulators 4, in order to firmly hold the electric heating wires 2, electric wires 3, and insulators 4 on the jacket 100. Accordingly, the electric heating wires 2, electric wires 3, and insulators 4 are prevented from moving during a procedure of washing the jacket 100.

35 The first connecting plugs 5 are connected to the electric heating wires 2 embedded in the front portion of the jacket 100 such that they are externally exposed.

Subsequently, the rechargeable batteries 200 are received in respective pockets 1 of the jacket 100, and connected to respective first connecting jacks 10.

The exposed first connecting plugs 5 are then connected to respective first connecting jacks 10, thereby causing the electric power from the batteries 200 to be supplied to the electric heating wires 2.

5 The batteries 200 supply a voltage of 3.6 V across each electric heating wire 2. This can be achieved by connecting, in parallel, two sets of three rechargeable 1.2 V batteries connected in series, or connecting, in parallel, two sets of five rechargeable 1.2 batteries connected in series.

10 Thereafter, the operating switch 21 is connected to the batteries 200. As described above, the operating switch 21 serves to conduct ON/OFF switching operations for controlling the supply of electric power to the electric heating wires 2. The remaining power display unit (indicator) 22 for allowing the wearer to check the charged/discharged state of the batteries 200 is also connected to the batteries 200. The operating switch 21 and remaining power display unit 22 are externally exposed.

15 That is, the operating switch 21 and remaining power display unit 22 are designed to be connected to the batteries 200 while being separable from the jacket 100 along with the batteries 100 when the jacket 100 is to be washed.

20 When the user wearing the jacket 100 switches on the operating switch 21 in a state in which the first connecting plugs 5 and first connecting jacks 10 are connected to each other, the electric power charged in the batteries 200 are supplied to the heating core wires of the electric heating wires 2 connected in parallel by the electric wires 3 via the first connecting plugs 5 and first connecting jacks 10.

25 As a result, the heating core wires 2a operate to generate heat. Accordingly, the user wearing the jacket 100 can maintain a warm body temperature even in the open air or in a place with a sub-zero temperature (for example, a cold storage warehouse).

30 The sheath 2b surrounding the heating core wire 2a is made of a material produced by mixing a mixture of elvan, yellow earth, and gem powder with Teflon. The sheath 2b radiates far infrared rays considerably beneficial to health in accordance with the heating operation of the heating core wire 2a while absorbing harmful waves generated due to the heating operation of the core wire 2a. Accordingly, the sheath 2b protects the wearer from adverse effects of the harmful waves. The sheath 2b also protects the heating core wire 2a while more rapidly transferring the heat generated from the heating core wire 2a by its constitutive component, that is, Teflon.

35 The remaining power display unit (indicator) 22, which is connected to the batteries 200 while being externally exposed from the jacket 100, displays the

charged/discharged state of the batteries 200 to allow the wearer to more easily check the charged/discharged state of the batteries 200. Accordingly, the wearer wearing the jacket 100 can easily and rapidly determine whether or not the batteries 200 are to be replaced by new ones, after checking the charged/discharged state of the batteries 200.

Meanwhile, where it is necessary to wash the jacket 100 because its surface is dirtied or stained by foreign matters or after being worn by the user for a prolonged period of time, the first connecting jacks 10 are first separated from respective first connecting plugs 5.

Thereafter, the batteries 200, operating switch 21, and remaining power display unit 22 are separated from the jacket 100 along with the first connecting jacks 10.

Then, the sealing cover 6, which is connected to each first connecting plug 5 by the string 7 in order to prevent its loss, is threadedly coupled to the first connecting plug 5.

As described above, the first connecting plug 5 is provided with the first threaded portion 5a at its outer circumferential surface, whereas the sealing cover 6 is provided with the second threaded portion 6a at its inner circumferential surface. The sealing O-ring 5b is also fitted around the outer circumferential surface of the first connecting plug 5.

Accordingly, when the sealing cover 6 is threadedly coupled to the first connecting plug 5, the first connecting plug 5 can be maintained in a completely sealed state.

As shown in Figs. 8 and 9, the complete sealing of first connecting plug 5 may be achieved by coupling the first connecting plug 5 and sealing cover 6 to each other in a fitting fashion. This can be accomplished by fitting a plurality of sealing O-rings 5b around the outer circumferential surface of the first connecting plug 5. Of course, the present invention is not limited to this configuration.

Even when the jacket 100 is crumpled during a procedure of being washed in a washing machine under the condition in which each first connecting plug 5b externally exposed from the jacket 100 is sealed by the sealing cover 6, the electric heating wires 2 and electric wire 3 are maintained in position without moving, by virtue of the sewing lines 8 formed therearound. The connecting portions of the heating core wires 2a and electric wire 3 at the regions A are treated to be waterproof by the insulator 4 made of a silicon material. Accordingly, it is possible to prevent the heating core wires 2 and electric wire 3 from being contacted by water during a procedure of washing the jacket 100. Thus, the jacket 100 can

be washed without any separation of the electric heating wires 2.

Although not shown, a separate temperature controller may be electrically connected to the electric heating wires 2 in accordance with another embodiment of the present invention, in order to allow the wearer to optionally control the heating temperature of the electric heating wires 2 heating the jacket 100.

In this case, it is possible to prevent the electric heating wires 2 from being overheated because the wearer wearing the jacket 100 can adjust the heating temperature of the electric heating wires 2 by manipulating the temperature controller. In this case, the jacket 100 can meet the personal taste of the wearer.

#### Embodiment 2

Another embodiment of the present invention will be described hereinafter in conjunction with Figs. 10 to 13.

In Figs. 10 to 13, elements having the same structure and function as those in the above described embodiment are denoted by the same reference numerals, respectively, and unnecessary description thereof will be omitted.

In accordance with this embodiment, a plurality of elastic band members 40 are provided at the shoulder and flank portions of the jacket 100 so that the jacket 100 comes into tight contact with the body of the wearer. An external control panel 20 is also provided. Since the jacket 100 comes into tight contact with the body of the wearer by virtue of the elasticity of the elastic band members 40, it is possible to effectively prevent the heat generated in accordance with the heating operation of the electric heating wires 2 from escaping, while obtaining a maximum insulating effect.

The control panel 20 includes an operating switch 21 adapted to conduct ON/OFF switching operations for supplying electric power from first and second batteries 200 and 200' to the electric heating wires 2, and a remaining power display unit 22 for allowing the wearer to check the charged/discharged state of the first and second batteries 200 and 200'. A second connecting plug 23 is connected to the control panel 20 such that it is integral with the control panel 20. The second connecting plug 23 is adapted to be electrically connected to a second connecting jack 11 provided at the first battery 200.

The jacket 100 has inner and outer layers 50 and 51 dyed with a yellow earth material 70, as shown in Fig. 11. In accordance with this treatment, the inner and outer layers 50 and 51 radiate far infrared rays beneficial to health. The inner and outer layers 50 and 51 also prevent rash and body odor while performing a sweat control function. The inner and outer layers 50 and 51 also achieve an

improvement in the venting ability of the jacket 100.

As shown in Fig. 12, each electric heating wire 2 is wrapped by an additional inner layer 60 coated with a heat loss preventing agent, and then embedded between the inner and outer layers 50 and 51. The resultant structure is subjected to a bonding treatment using an adhesive or a sewing treatment using threads.

By virtue of the additional inner layer 60 coated with the heat loss preventing agent, the heat generated in accordance with the heating operation of the electric heating wires 2 can be more easily transferred to the inner layer 50 of the jacket 100 without escaping through the outer layer 51. Accordingly, the insulating ability of the jacket 100 is correspondingly increased.

Alternatively, each electric heating wire 2 may be wrapped by a double-sided tape 80 coated, at both surfaces thereof, with yellow earth powder, elvan powder, gem powder or charcoal powder, as shown in Fig. 13. The additional inner layer 60, which is coated with a heat loss preventing agent, is laminated over the double-sided tape 80. A sponge 90 exhibiting a high foamability is laminated over the additional inner layer 60, that is, between the additional inner layer 60 and the outer layer 51.

Each of the inner and outer layers 50 and 51 of the jacket 100 laminated around each electric heating wire 2, the double-sided tape 80, the additional inner layer 60, and the sponge 90 is subjected, at opposite sides thereof, to a bonding treatment using an adhesive or a sewing treatment using threads to form movement preventing lines 8 at the opposite sides, respectively.

These movement preventing lines 8 serves to prevent the electric heating wires 2 and electric wire 3 from moving during a procedure of washing the jacket 100, thereby minimizing their deformation while allowing them to operate normally after the washing procedure.

The double-sided tape 80 is coated, at both surfaces thereof, with a material radiating far infrared rays beneficial to health, that is, yellow earth powder, elvan powder, gem powder or charcoal powder.

Accordingly, the coatings on the double-sided tape 80 radiate far infrared rays beneficial to the health of the wearer wearing the jacket 100 during the heating operation of the electric heating wires 2.

The additional inner layer 80, which is coated with a heat loss preventing material, and laminated over the double-sided tape 400, serves to prevent the heat generated from the electric heating wires 2 from escaping through the outer layer 51. Accordingly, it is possible to maximize the insulating effect of the jacket 100.

The high-foamable sponge 90 interposed between the additional inner layer 80 and the outer layer 51 brings the jacket 100 into close contact with the body of the wearer. Accordingly, the heat from the electric heating wires 2 prevented from escaping by the additional inner layer 80 can be more effectively transferred to the body of the wearer.

Although not shown, the control panel 20 including the operating switch 21 and remaining power display unit 22 is electrically connected to the first battery 200 via an electric wire. Of course, the connection between the control panel 20 and the first battery 200 may be achieved in a wireless fashion.

In the latter case, it is preferable for the first battery 200 to be equipped with a receiver unit for receiving a radio frequency signal transmitted from the control panel 20.

### Embodiment 3

Referring to Fig. 14, trousers 100 are illustrated which include an inner layer 1, and an outer layer 2. The inner and outer layers 1 and 2 are subjected to a dyeing treatment using yellow earth so as to radiate far infrared rays. A panel receiving pocket 1 is formed at an upper end of the outer layer 2.

Electric heating wires 2, which consist of a heating core wire 2a, and a sheath 2b, are prepared by cutting an electric heating wire into pieces having a desired length. The electric heating wires 2 are arranged at desired regions between the inner and outer layers 1 and 2. The electric heating wires 2 are connected at their opposite ends by an electric wire 3 such that they are connected in parallel. The connecting portions of the electric heating wires 2 are sealed by insulators 4. Each of the electric heating wires 2 and electric wire 3 is subjected, at opposite sides thereof, to a sewing treatment using threads to form movement preventing lines 8 at the opposite sides, respectively.

Referring to Fig. 15, a control panel 20 is illustrated which has a battery receiving chamber 26 formed to be integral with the control panel 20. The control panel 20 is provided with an operating switch 21, a remaining power display unit 22, a temperature control switch 24, and a connecting jack 25. The battery receiving chamber 26 receives batteries 27 at the back side of the control panel 20.

When it is desired to wash the trousers, the control panel with the batteries is separated from the trousers. Also, a cover 6 is coupled to a connecting plug 5 connected to the connecting jack 25 so as to seal the connecting plug 5. In this state, the trousers can be washed.

#### Embodiment 4

Referring to Figs. 16 to 18, a shoe 300 is illustrated, to which electric heating wires 440 are applied.

The electric heating wires 440, which have a desired length, are arranged on the upper surface of an outer sole in the shoe 300 to be covered by an inner sole 301. The electric heating wires 440 are connected at their opposite ends by an electric wire 443 such that they are connected in parallel. The electric wire 443 extends to a fastening flap 303 of the shoe 300 along one side of the shoe 300.

A connecting cord 470 is connected to opposite ends of the electric wire 443 extended to the fastening flap 303 such that it is externally exposed.

The fastening flap 303 is attached to an outer surface of the shoe 300, and provided with a hook-and-loop fastener tape 302. A panel receiving pocket 420 is formed at the fastening flap 303 to receive a control panel 430. When the connecting cord 470 is connected to a connecting jack 434 provided at the control panel 430, the electric heating wires 440 generate heat. Accordingly, the foot of the wearer wearing the shoe 300 is kept warm.

When the shoe 300 is to be washed, the connecting cord 470 is sealed by a sealing cover 480. Also, the control panel 430 is removed from the panel receiving pocket 420. In this state, the shoe 300 can be washed.

The cloth of the shoe 300 may be subjected to a dyeing treatment using yellow earth prior to the manufacture of the shoe 300. Of course, this dyeing treatment using yellow earth may be dispensed with.

#### Embodiment 5

Fig. 19 illustrates another embodiment of the present invention. Referring to Fig. 19, an abdominal binder 500 is illustrated which has a hook-and-loop fastener tape 302.

A serial electric heating wire 540 is arranged in the abdominal binder 500. A connecting cord 570 is connected to opposite ends of the electric heating wire 540 such that it is externally exposed.

A panel receiving pocket 520 is formed at one side portion of the abdominal binder 500 to receive a control panel 530. When the connecting cord 570 is connected to a connecting jack 534 provided at the control panel 530, the electric heating wire 540 generates heat. Accordingly, the abdomen of the wearer wearing the abdominal binder 500 is kept warm.

When the abdominal binder 500 is to be washed, the connecting cord 570 is sealed by a sealing cover 580. Also, the control panel 530 is removed from the



panel receiving pocket 520. In this state, the abdominal binder 500 can be washed.

The cloth of the abdominal binder 500 may be subjected to a dyeing treatment using yellow earth prior to the manufacture of the abdominal binder 500. Of course, this dyeing treatment using yellow earth may be dispensed with.

5 In place of the serial electric heating wire 540, a plurality of electric heating wires each having a desired length may be arranged in the abdominal binder 500 such that they are connected in parallel by an electric wire 543.

10 Although the heating operation of the electric heating wires is achieved using separate batteries in all the above described embodiments, it may be achieved using a battery equipped in a vehicle under the condition in which the wearer is riding in the vehicle.

15 In the latter case, although not shown, a modification may be implemented to connect, to a cigarette jack in the vehicle, the connecting cord externally protruded while being connected to the electric heating wires embedded between the inner and outer layers of the product.

20 When the occupant in the vehicle, who wears the product equipped with the electrical heating device, connects the connecting cord of the product to the cigarette jack of the vehicle, heat is generated from the electrical heating device. Accordingly, the occupant can maintain a warm body temperature by the heat generated from the electrical heating device as well as heat generated from a heater equipped in the vehicle.

#### Industrial Applicability

25 As apparent from the above description, the present invention provides a product applied to a jacket, trousers, a shoe, an abdominal binder, or the like, and adapted to generate heat in accordance with the supply of electric power, thereby maintaining the warm body temperature of the user wearing the product for the purpose of protecting the user from cold (for example, in a cold storage warehouse or in winter).

30 The product, which includes electric heating wires, can be washed without separation of those electric heating wires.

35 The product also includes inner and outer layers subjected to a dyeing treatment using natural yellow earth. Accordingly, it is possible to prevent harmful waves such as electromagnetic waves, generated in accordance with the heating operation of the electric heating wires, from being transmitted to the body of the wearer wearing the product. Since far infrared rays are emitted from the yellow earth, it is possible to prevent rash and body odor while achieving a sweat

control function. An improvement in venting ability is also achieved. Accordingly, the heat of the wearer is improved.

Although the preferred embodiments of the invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various  
5 modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

## Claims

1. An electric heating garment for use in winter comprising:  
electric heating wires each including a heating core wire adapted to  
generate heat upon receiving electric power, and a sheath coated over the heating  
core wire;  
5 the electric heating wires being arranged in parallel between inner and outer  
layers of the garment, each of the electric heating wires having a predetermined  
length;  
an electric wire connecting the electric heating wires in parallel;  
10 silicon insulators adapted to seal connected portions of the electric heating  
wires to the electric wire;  
movement preventing lines formed at the inner and outer layers along the  
electric heating wires and electric wire at opposite sides of the electric heating wires  
and electric wire, and adapted to prevent the electric heating wires and electric wire  
15 from moving, respectively; and  
pockets respectively adapted to separably receive rechargeable batteries  
adapted to supply electric power to the electric heating wires, and a control panel.
2. The electric heating garment according to claim 1, wherein the control  
panel comprises an operating switch adapted to switch on/off the supply of electric  
20 power to the electric heating wires, and a remaining power display unit for  
displaying a charged/discharged state of the batteries.
3. The electric heating garment according to claim 2, wherein the control  
panel further comprises a temperature controller adapted to allow a wearer wearing  
the garment to optionally adjust a heating temperature of the electric heating wires.
- 25 4. The electric heating garment according to claim 1, further comprising:  
first connecting jacks provided at the batteries, respectively;  
first connecting plugs respectively connected to opposite ends of the  
electric wire while being externally exposed, the first connecting plugs being  
connected to the first connecting jacks to supply electric power from the batteries to  
30 the electric heating wires, respectively; and  
sealing covers connected to the first connecting plugs by strings, and  
adapted to be coupled to the first connecting plugs to prevent the first connecting  
plugs from contacting water, respectively, whereby the garment is washable after

removal of the batteries and control panel from the pockets.

5. The electric heating garment according to claim 1, wherein the sheath is made of a material produced by mixing a mixture of elvan, yellow earth, and gem powder with Teflon exhibiting superior waterproof and conductive properties.

5           6. The electric heating garment according to claim 1, wherein each of the electric heating wires is wrapped by an additional inner layer coated with a heat loss preventing agent, and subjected to a bonding treatment using an adhesive or a sewing treatment using threads.

7. The electric heating garment according to claim 1, wherein:

10           each of the electric heating wires is wrapped by a double-sided tape coated, at both surfaces thereof, with yellow earth powder, elvan powder, gem powder or charcoal powder;

            an additional inner layer coated with a heat loss preventing agent for preventing heat from escaping is laminated over the double-sided tape; and

15           the electric heating wire, double-sided tape, and additional inner layer are subjected to a bonding treatment using an adhesive or a sewing treatment using threads.

8. The electric heating garment according to claim 7, wherein a high-formable sponge is interposed between the additional inner layer and the outer layer.

9. The electric heating garment according to claim 1, wherein:

            the garment has the form of a jacket; and

            the jacket has heating sections defined by the electric heating wires at both front portions thereof and a back portion thereof, respectively.

25           10. The electric heating garment according to claim 9, wherein the jacket has a plurality of straight elastic bands arranged at shoulder and flank portions of the jacket, each of the elastic bands having an elasticity to bring the jacket to come into tight contact with the body of a wearer wearing the jacket.

11. The electric heating garment according to claim 1, wherein:

30           the garment has the form of trousers; and

each of the trousers has heating sections defined by the electric heating wires at a front surface thereof, a waist portion thereof, and a back surface thereof, respectively.

12. An electric heating structure in a washable article including inner and outer layers, comprising:

the inner and outer layers subjected to a dyeing treatment using yellow earth so as to radiate far infrared rays during a heating operation of electric heating wires, the outer layer being provided with a panel receiving pocket at one end thereof, ;

a control panel separably received in the panel receiving pocket, the control panel including an operating switch, a remaining power display unit, a temperature control switch, an insulatable and sealable connecting jack, and batteries;

the electric heating wires interposed between the inner and outer layers, each of the electric heating wire including a heating core wire, and a sheath made of a mixture of diverse materials;

an insulating member wrapped around each of the electric heating wires, the insulating member having a multi-layer structure, and serving to prevent heat generated from the electric heating wire from escaping through the outer layer while increasing an effect of transferring the heat to the body of a wearer wearing the article via the inner layer, thereby causing the article to exhibit an enhanced insulating effect in a worn state;

insulators made of a silicon material, and coated on connected portions of each of the electric heating wires to an electric wire to prevent externally-exposed portions of the heating core wire of the electric heating wire from contacting water during a procedure of washing the article;

a connecting cord connected to opposite ends of the electric wire held between the inner and outer layers of the article, the connecting cord being adapted to be connected to the connecting jack of the control panel to supply electric power from the batteries to the electric heating wires; and

a sealing cover connected to the connecting cord by a string, and adapted to be coupled to the connecting cord to prevent the connecting cord from contacting water during the washing procedure.

13. The electric heating structure according to claim 12, wherein the electric heating wires are formed by cutting an electric heating wire product into pieces each having a predetermined length, and peeling off the sheath of each of the pieces at

opposite ends of the piece, thereby externally exposing opposite ends of the heating core wire of the piece, and the electric heating wires are arranged in the article while being connected in parallel in accordance with a connection of the electric wire to the exposed ends of the heating core wires.

5           14. The electric heating structure according to claim 12, wherein the electric heating wires are arranged in the article while being connected in series to form a serial electric heating wire structure, and the connecting cord is connected to opposite ends of the serial electric heating wire structure.

10           15. The electric heating structure according to claim 12, wherein the insulating member wrapped around each of the electric heating wires comprises:

          a first additional inner layer wrapped around the electric heating wire, and coated with a heat loss preventing agent to provide a width for receiving an expansion of the electric heating wire occurring when the electric heating wire generates heat;

15           a double-sided tape wrapped over the first additional inner layer, and coated, at both ends thereof, with a material beneficial to health;

          a second additional inner layer wrapped over the double-sided tape, and coated with a heat loss preventing agent to prevent the heat generated from the electric heating wire from escaping through the outer layer; and

20           a high-foamable sponge interposed between the second additional inner layer and the outer layer, and adapted to enhance an ability of the article to come into contact with the body of the wearer.

          16. The electric heating structure according to claim 12, wherein the control panel further includes radio-frequency receiving means,

25           the electric heating structure further comprising an external radio-frequency transmitting remote controller adapted to control the control panel.

          17. The electric heating structure according to claim 12, wherein:

          the article is a shoe;

30           the electric heating wires are arranged on an upper surface of an outer sole of the shoe; and

          the batteries and operating switch are arranged in a heel portion of the shoe or an optional portion of the shoe, and connected to the electric heating wires by the connecting jack.

18. The electric heating structure according to claim 12, wherein:  
the article is an abdominal binder;  
the electric heating wires are embedded in the abdominal binder; and  
the batteries and operating switch are arranged at an optional portion of the  
5 abdominal binder, and connected to the electric heating wires by the connecting  
jack.

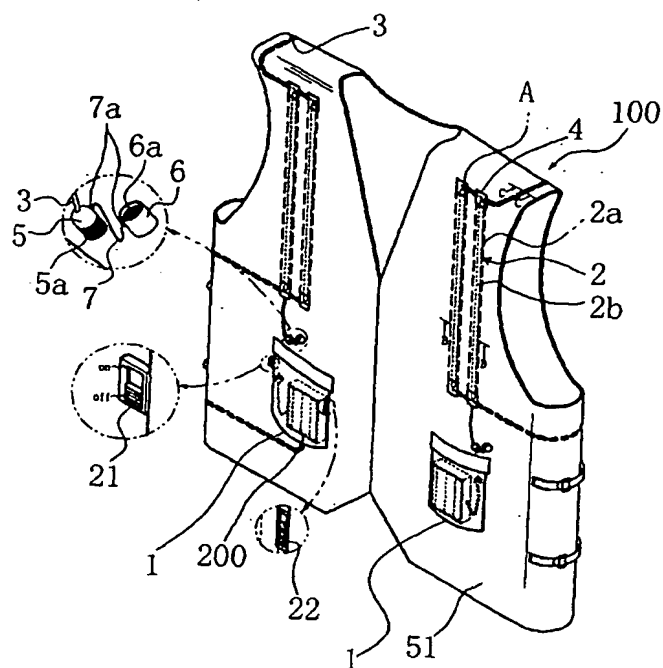


FIG. 1

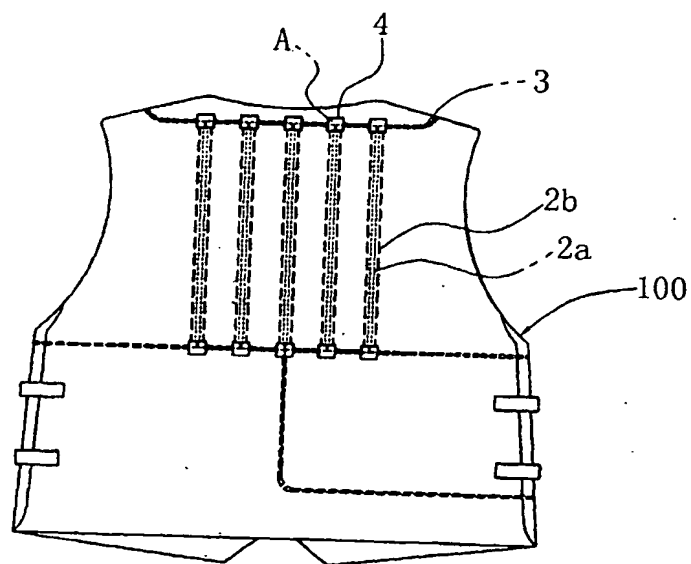


FIG. 2



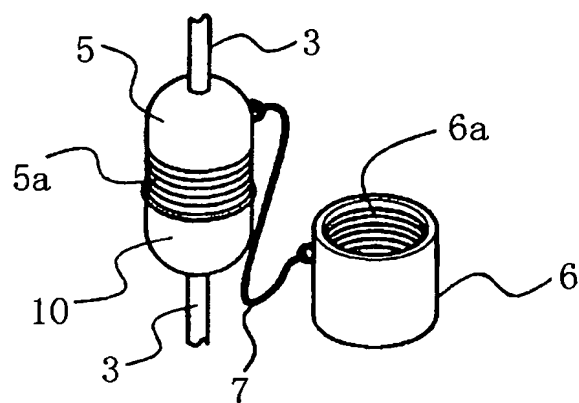


FIG. 3

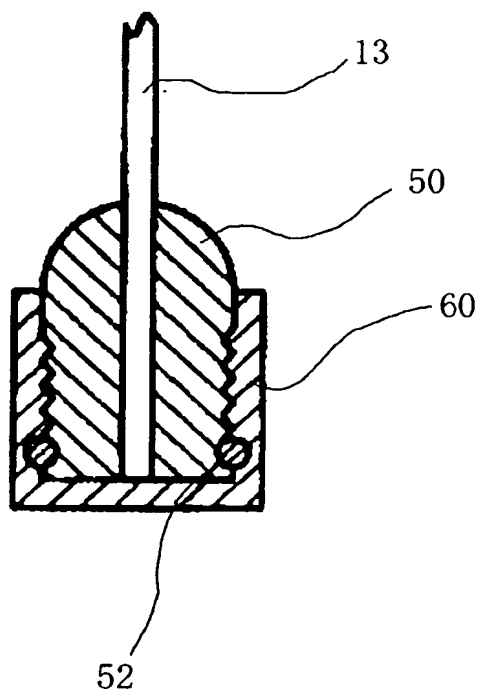


FIG. 4

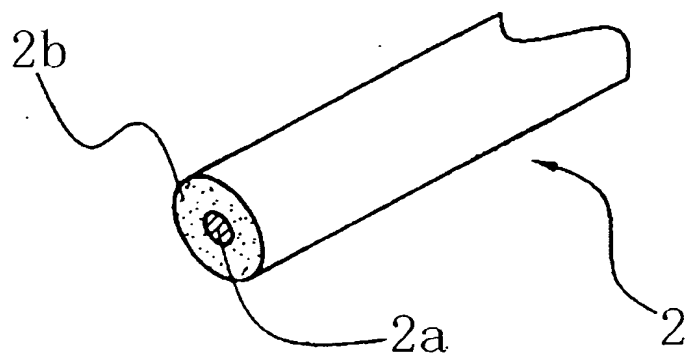


FIG. 5

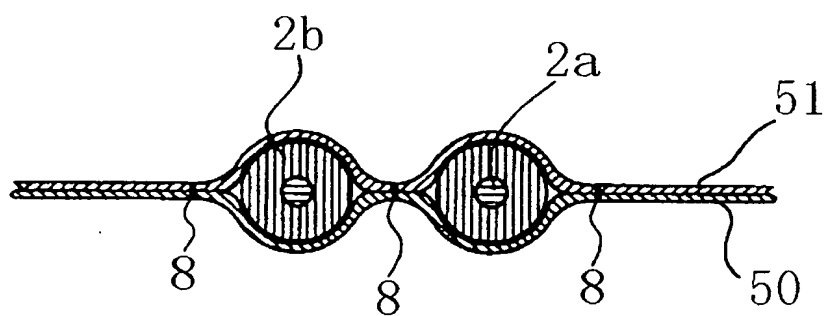


FIG. 6

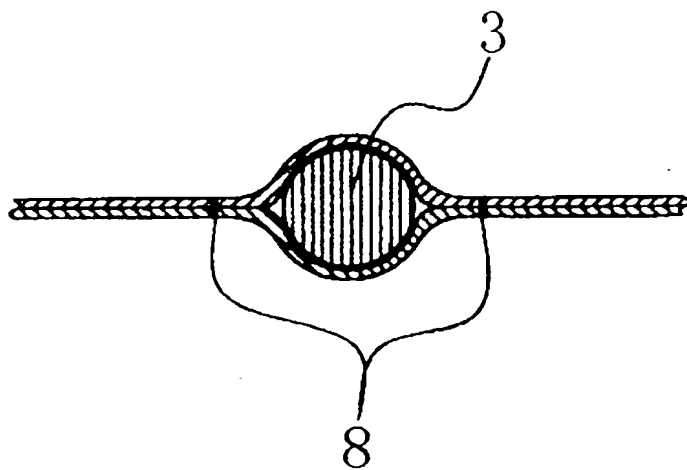


FIG. 7

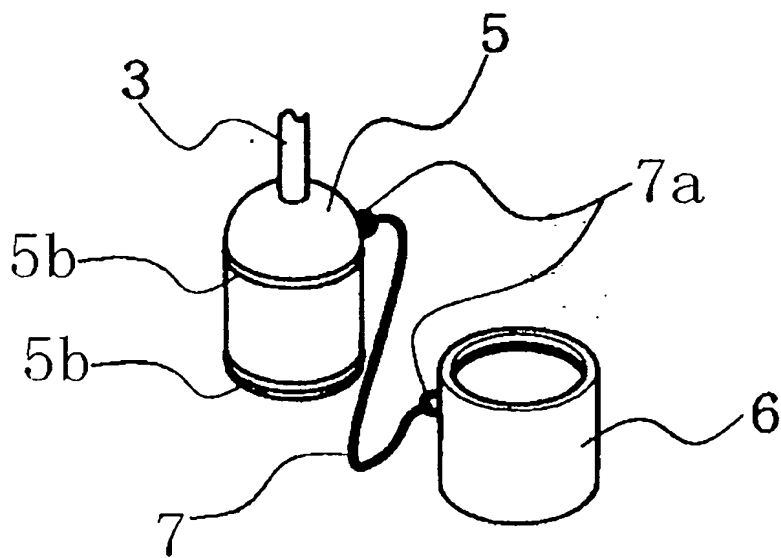


FIG. 8

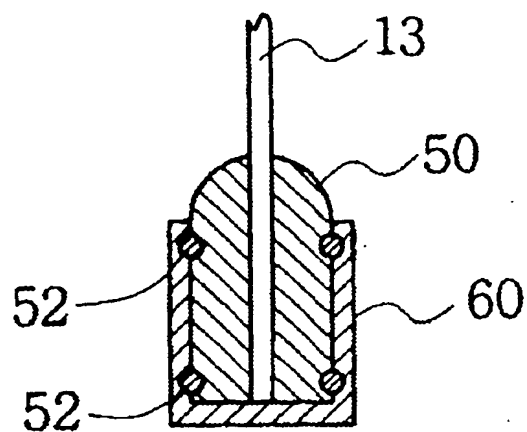


FIG. 9

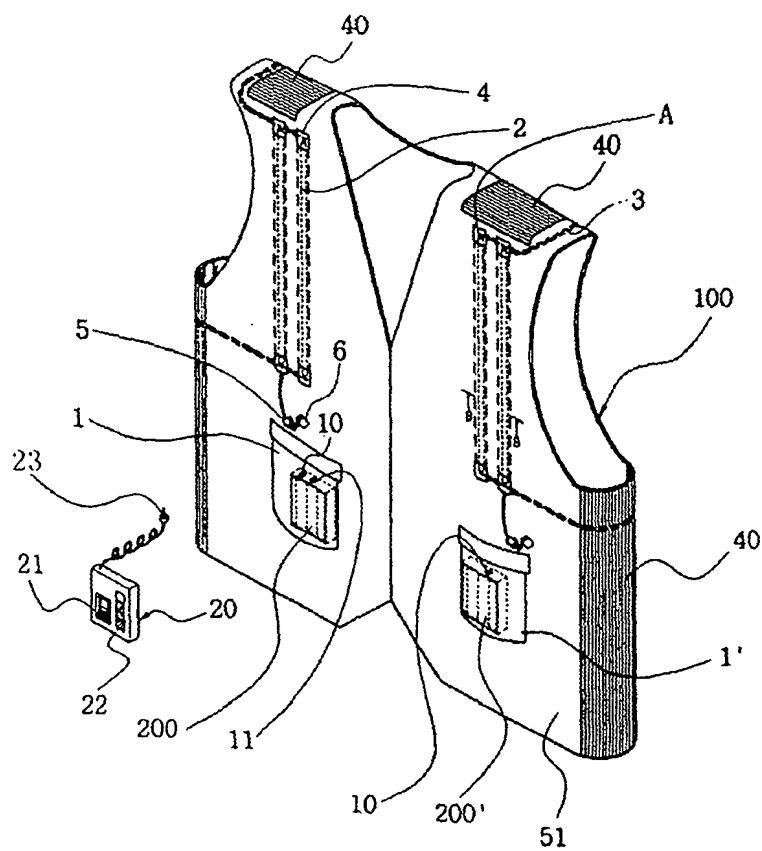


FIG. 10

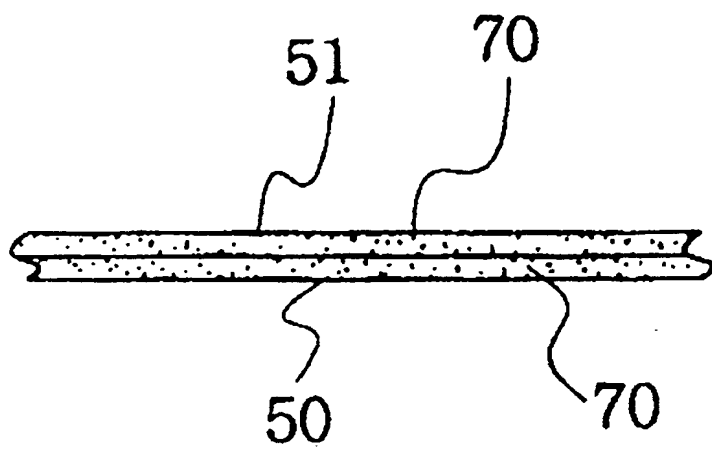


FIG. 11

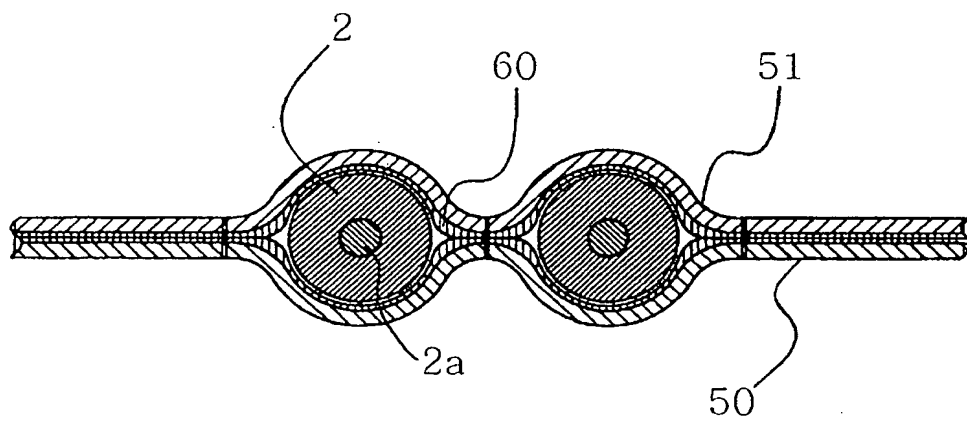


FIG. 12

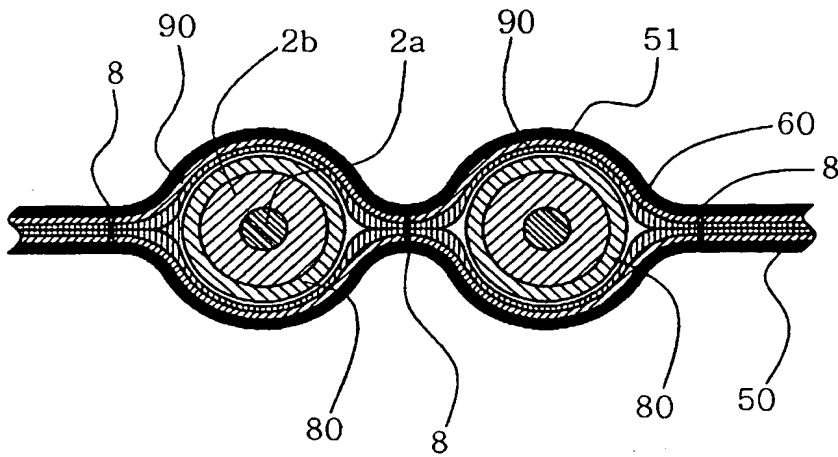


FIG. 13

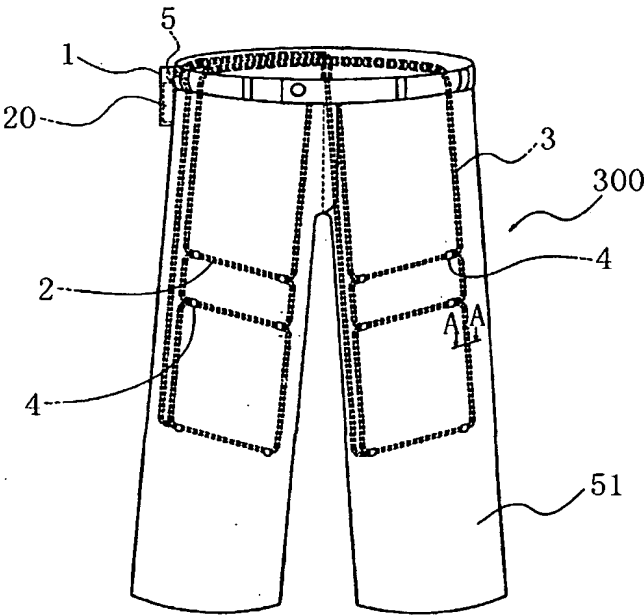


FIG. 14

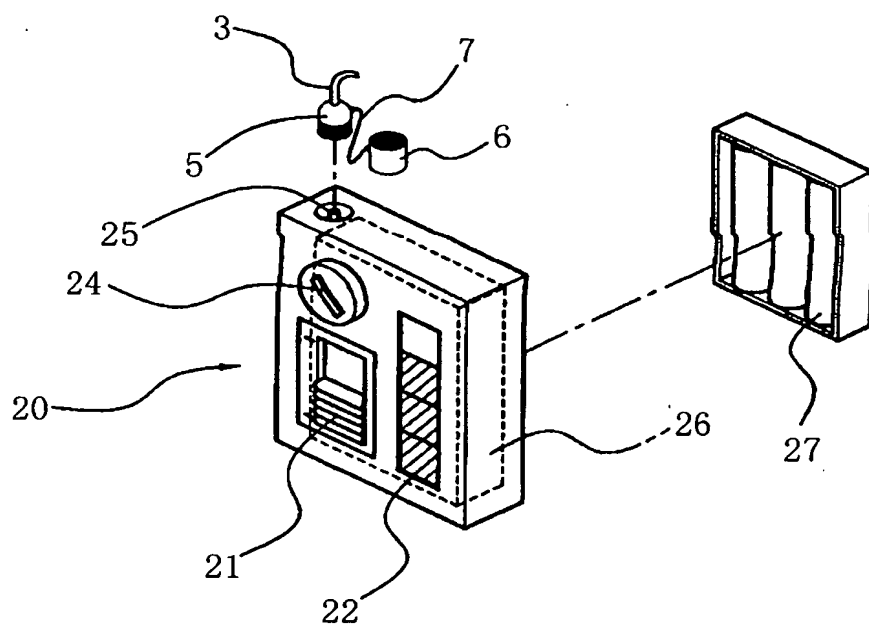


FIG. 15

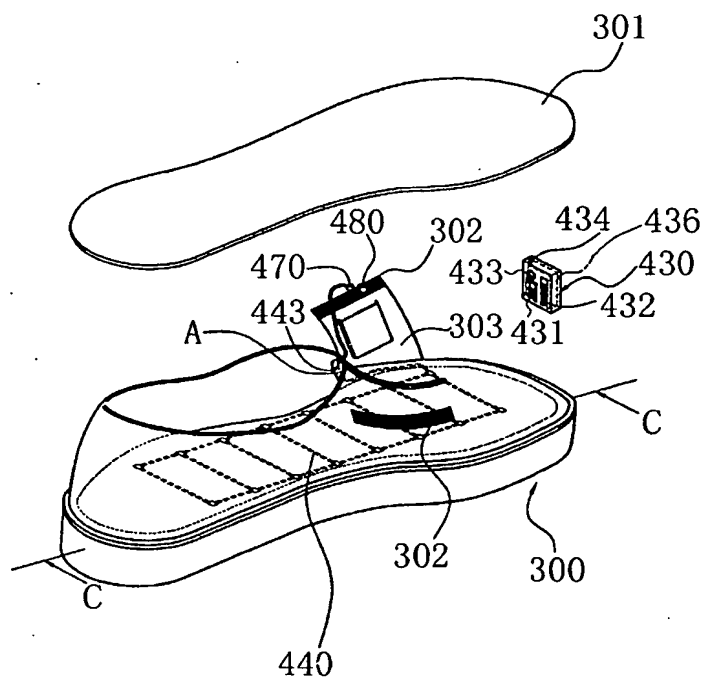


FIG. 16

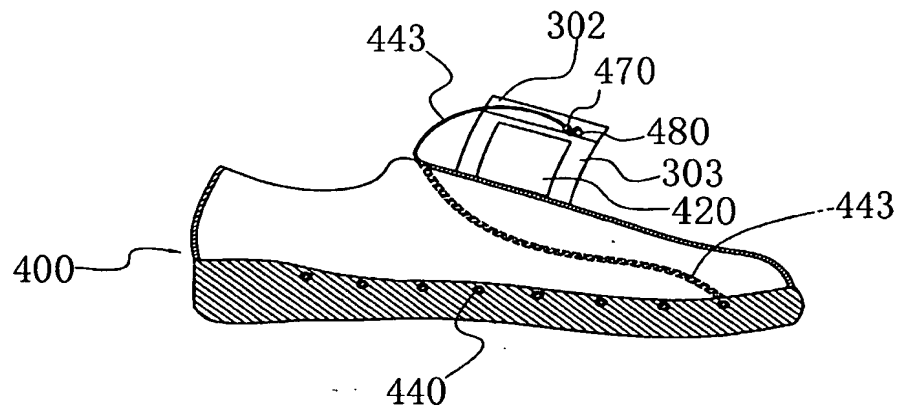


FIG. 17

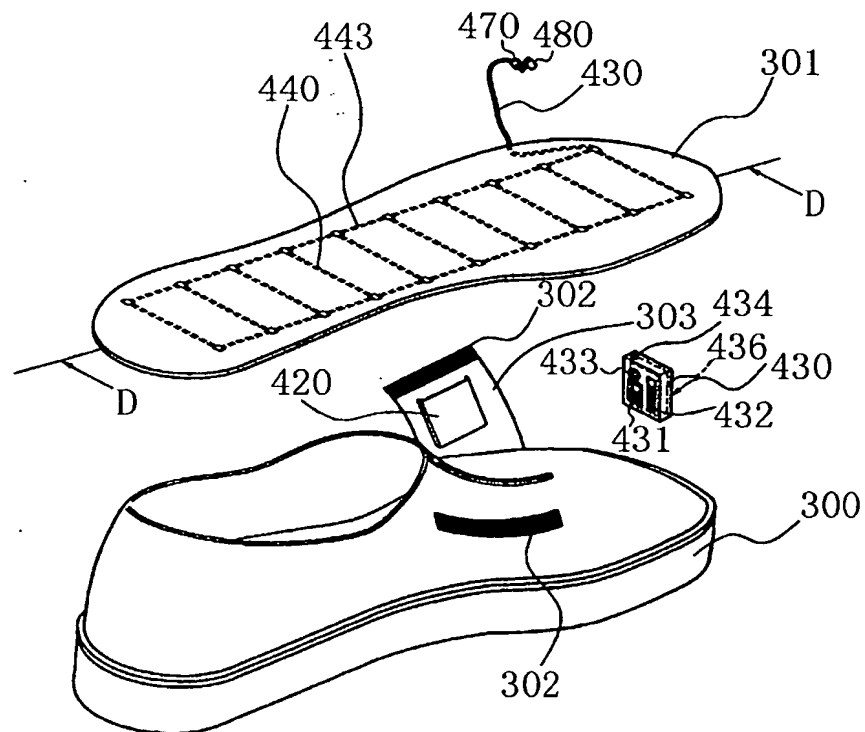


FIG. 18



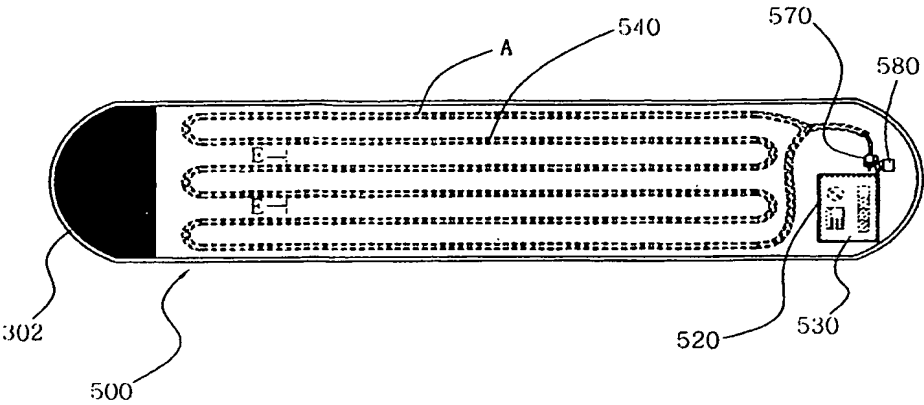


FIG. 19

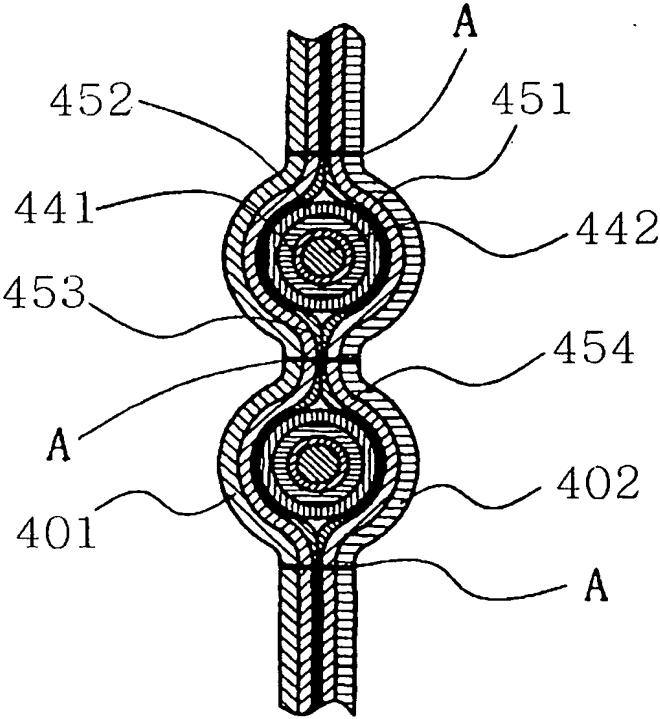


FIG. 20

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/KR03/00080

**A. CLASSIFICATION OF SUBJECT MATTER****IPC7 A41D 1/00**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC7 A41D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR : IPC as above

JP : IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 99-0035271 U (PARK YOUNG SECK) 06 SEPTEMBER 1999 see the whole document.	1, 2, 12
A	KR 20-0199828 Y1 (CHOI SUNG WON) 04 AUGUST 2000 see the whole document.	1, 2, 4-5, 12, 13, 15
A	US 4,696,066 A ( JOYCE A. BALL) 29 SEPTEMBER 1987 see the whole document.	1
A	JP 09-111515 A (MISAKA SANGYO K.K.) 28 APRIL 1997 see the whole document.	1

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

\* Special categories of cited documents:

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

07 MAY 2003 (07.05.2003)

Date of mailing of the international search report

09 MAY 2003 (09.05.2003)

Name and mailing address of the ISA/KR



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